AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in this application.

1. (currently amended) A microfluidic device for separating particles according to size comprising a microfluidic channel, and an array comprising a network of gaps within the microfluidic channel, wherein the device employs a field that propels the particles being separated through the microfluidic channel; and wherein a flux of the field from the gaps is divided unequally into a major flux component and a minor flux component into subsequent gaps in the network such that the average direction of the major flux ~~components~~ component is not parallel to the average direction of the field, and, when particles are introduced into the array, particles having a size less than a predetermined critical size are transported generally in the average direction of the field, and particles having a size at least that of the critical size are transported generally in the average direction of the major flux component, thereby separating the particles according to size.

2. (original) The microfluidic device of claim 1, wherein the array is an ordered array of obstacles.

3. (original) The microfluidic device of claim 2, wherein the ordered array of obstacles comprises obstacles arranged in rows, wherein each subsequent row of obstacles is shifted laterally with respect to the previous row.

4. (original) The microfluidic device of claim 2, wherein the ordered array of obstacles is tilted at an offset angle θ with respect to the direction of the field.

5. (previously presented) The microfluidic device of claim 1, wherein the field is fluid flow, electrical, electrophoretic, electro-osmotic, centrifugal, gravitational, hydrodynamic, pressure gradient, or capillary action.

6. (original) The microfluidic device of claim 5, wherein the field is a fluid flow.

7. (original) The microfluidic device of claim 5, wherein the field is an electrical field.

8. (original) The microfluidic device of claim 1, wherein the particles are bacteria, cells, organelles, viruses, nucleic acids, proteins, protein complexes, polymers, powders, latexes, emulsions, or colloids.

9. (original) The microfluidic device of claim 1, wherein the particles are DNA molecules.

10. (previously presented) A microfluidic device for separating particles according to size comprising:
a microfluidic channel, and an ordered array of obstacles within the microfluidic channel, wherein the device employs a field that propels the particles being separated through the microfluidic channel; and the ordered array of obstacles is asymmetric with respect to the average direction of the field, such that, when particles are introduced into the array, particles having a size less than a predetermined critical size are transported in a first direction, and particles having a size at least that of the critical size are transported in a second direction, wherein the first and second directions are different, thereby separating the particles according to size.

11. (original) The microfluidic device of claim 10, wherein the ordered array of obstacles comprises obstacles arranged in rows, wherein each subsequent row of obstacles is shifted laterally with respect to the previous row.

12. (original) The microfluidic device of claim 10, wherein the ordered array of obstacles is tilted at an offset angle θ with respect to the direction of the field.

13. (original) The microfluidic device of claim 10, wherein the field is fluid flow, electrical, electrophoretic, electro-osmotic, centrifugal, gravitational, hydrodynamic, pressure gradient, or capillary action.

14. (original) The microfluidic device of claim 13, wherein the field is a fluid flow.

15. (original) The microfluidic device of claim 13, wherein the field is an electrical field.

16. (original) The microfluidic device of claim 10, wherein the particles are bacteria, cells, organelles, viruses, nucleic acids, proteins, protein complexes, polymers, powders, latexes, emulsions, or colloids.

17. (original) The microfluidic device of claim 16, wherein the particles are DNA molecules.

18. (currently amended) A method for separating particles according to size comprising: introducing the particles to be separated into a microfluidic channel comprising a network of gaps within the microfluidic channel; and applying a field to the particles to propel the particles through the microfluidic channel, wherein a flux of the field from the gaps is divided unequally into a major flux component and a minor flux component into subsequent gaps in the network such that the average direction of the major flux ~~components~~ component is not parallel to the average direction of the field, and particles having a size less than a predetermined critical size are transported generally in the average direction of the field, and particles having a size at least that of the critical size are transported generally in the average direction of the major flux component, thereby separating the particles according to size.

19. (original) The method of claim 18, wherein the network of gaps is constructed from an array of obstacles.

20. (original) The method of claim 19, wherein the array of obstacles is an ordered array of obstacles.

21. (original) The method of claim 20, wherein the ordered array of obstacles comprises obstacles arranged in rows, wherein each subsequent row of obstacles is shifted laterally with respect to the previous row.

22. (original) The method of claim 20, wherein the ordered array of obstacles is tilted at an offset angle θ with respect to the direction of the field.

23. (original) The method of claim 18, wherein the field is fluid flow, electrical, electrophoretic, electro-osmotic, centrifugal, gravitational, hydrodynamic, pressure gradient, or capillary action.

24. (original) The method of claim 23, wherein the field is a fluid flow.

25. (original) The method of claim 23, wherein the field is an electrical field.

26. (original) The method of claim 18, wherein the particles are bacteria, cells, organelles, viruses, nucleic acids, proteins, protein complexes, polymers, powders, latexes, emulsions, or colloids.

27. (original) The method of claim 26, wherein the particles are DNA molecules.

28. (previously presented) A method for separating particles according to size comprising:
introducing the particles to be separated into a microfluidic channel comprising an ordered array of obstacles; and
applying a field to the particles to propel the particles through the microfluidic channel, wherein the ordered array of obstacles is asymmetric with respect to the average direction of the field, such that particles having a size less than a predetermined critical size are transported in a first direction, and particles having a size at least that of the critical size are transported in a second direction, wherein the first and second directions are different, thereby separating the particles according to size.

29. (original) The method of claim 28, wherein the ordered array of obstacles comprises obstacles arranged in rows, wherein each subsequent row of obstacles is shifted laterally with respect to the previous row.

30. (original) The method of claim 28, wherein the ordered array of obstacles is tilted at an offset angle θ with respect to the direction of the field.

31. (original) The method of claim 28, wherein the field is fluid flow, electrical, electrophoretic, electro-osmotic, centrifugal, gravitational, hydrodynamic, pressure gradient, or capillary action.

32. (original) The method of claim 31, wherein the field is a fluid flow.

33. (original) The method of claim 31, wherein the field is an electrical field.

34. (original) The method of claim 28, wherein the particles are bacteria, cells, organelles, viruses, nucleic acids, proteins, protein complexes, polymers, powders, latexes, emulsions, or colloids.

35. (original) The microfluidic device of claim 34, wherein the particles are DNA molecules.

36. (currently amended) A microfluidic device for separating particles according to size comprising a microfluidic channel, and multiple arrays in series within the microfluidic channel, wherein each array has a different critical size, and wherein the device employs a field that propels the particles being separated through the microfluidic channel; each array comprises a network of gaps wherein a flux of the field from the gaps is divided unequally into a major flux component and a minor flux component into subsequent gaps in the network such that the average direction of the major flux ~~components~~ component in each array is not parallel to the average direction of the field, and, when particles are introduced into an array in the series, particles having a size less than the critical size of the array are transported generally in the average direction of the field, and particles having a size at least that of the critical size of the array are transported generally in the average direction of the major flux component, thereby separating the particles according to size.

37. (original) The microfluidic device of claim 36, wherein each array is an ordered array of obstacles.

38. (original) The microfluidic device of claim 37, wherein the ordered arrays of obstacles comprise obstacles arranged in rows, wherein each subsequent row of obstacles is shifted laterally with respect to the previous row.

39. (previously presented) The microfluidic device of claim 38, wherein the ordered arrays of obstacles are tilted at an offset angle θ with respect to the direction of the field.

40. (original) The microfluidic device of claim 36, wherein the field is fluid flow, electrical, electrophoretic, electro-osmotic, centrifugal, gravitational, hydrodynamic, pressure gradient, or capillary action.

41. (original) The microfluidic device of claim 40, wherein the field is a fluid flow.

42. (original) The microfluidic device of claim 40, wherein the field is an electrical field.

43. (original) The microfluidic device of claim 36, wherein the particles are bacteria, cells, organelles, viruses, nucleic acids, proteins, protein complexes, polymers, powders, latexes, emulsions, or colloids.

44. (original) The microfluidic device of claim 43, wherein the particles are DNA molecules.

45. (previously presented) The microfluidic device of claim 1, further comprising a first output, configured to accept particles having at least the predetermined critical size, and a second output, configured to accept particles smaller than the predetermined critical size.

46. (previously presented) The microfluidic device of claim 10, further comprising a first output configured to accept particles transported in the first direction and a second output configured to accept particles transported in the second direction.

47. (previously presented) The method of claim 18, further comprising introducing the particles having at least the predetermined critical size into a first output and the particles smaller than the predetermined critical size into a second output.

48. (previously presented) The method of claim 28, further comprising introducing the particles transported in the first direction into a first output and the particles transported in the second direction into a second output.

49. (previously presented) The microfluidic device of claim 36, wherein a last array in the series comprises at least one output configured to accept particles transported in the average direction of the major flux component of at least one array in the series.

50. (currently amended) A microfluidic device for concentrating particles, comprising a microfluidic channel, an array comprising a network of gaps within the microfluidic channel, and a boundary, wherein the device employs a field that propels the particles being concentrated through the microfluidic channel; and wherein a flux of the field from the gaps is divided unequally into a major flux component and a minor flux component into subsequent gaps in the network, such that the average direction of the major flux ~~components~~ component is not parallel to the average direction of the field, and, when particles having a size at least as large as a predetermined critical size are introduced into the array, the particles are transported generally towards the average direction of the major flux component to the boundary, thereby concentrating the particles at the boundary.

51. (previously presented) The microfluidic device of claim 50, wherein the array is an ordered array of obstacles.

52. (previously presented) The microfluidic device of claim 51, wherein the ordered array of obstacles comprises obstacles arranged in rows, wherein

each subsequent row of obstacles is shifted laterally with respect to the previous row; or

the ordered array of obstacles is tilted at an offset angle θ with respect to the direction of the field; or

a combination thereof.

53. (previously presented) The microfluidic device of claim 50, wherein the field is fluid flow, electrical, electrophoretic, electro-osmotic, centrifugal, gravitational, hydrodynamic, pressure gradient, or capillary action.

54. (previously presented) The microfluidic device of claim 53, wherein the field is a fluid flow.

55. (previously presented) The microfluidic device of claim 53, wherein the field is an electrical field.

56. (previously presented) The microfluidic device of claim 50, wherein the particles are bacteria, cells, blood cells, nuclei, organelles, viruses, nucleic acids, proteins, protein complexes, polymers, powders, latexes, emulsions, or colloids.

57. (previously presented) The microfluidic device of claim 50, wherein the particles are DNA molecules.

58. (previously presented) The microfluidic device of claim 50, wherein the microfluidic channel contains more than one array.

59. (previously presented) The microfluidic device of claim 50, further comprising an output, configured to accept particles from the boundary of the array.

60. (previously presented) The microfluidic device of claim 1, further comprising a boundary, such that, when particles having a size at least as large as the predetermined critical size are introduced into the array, the particles having a size at least as large as the predetermined critical size are transported generally to the boundary, thereby concentrating the particles at the boundary.

61. (previously presented) The microfluidic device of claim 10, further comprising a boundary, such that, when particles having a size at least as large as the predetermined critical size are introduced into the array, the particles having a size at least as large as the predetermined critical size are transported generally to the boundary, thereby concentrating the particles at the boundary.

62. (previously presented) The microfluidic device of claim 36, further comprising a boundary, such that, when particles having a size at least as large as the predetermined

critical size are introduced into the array, the particles having a size at least as large as the predetermined critical size are transported generally to the boundary, thereby concentrating the particles at the boundary.

63. (previously presented) The method of claim 18, further comprising transporting the particles having a size at least as large as the predetermined critical size to a boundary of the microfluidic channel, thereby concentrating the particles at the boundary.

64. (previously presented) The method of claim 28, further comprising transporting the particles having a size at least as large as the predetermined critical size to a boundary of the microfluidic channel, thereby concentrating the particles at the boundary.